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U.S. COAST GUARD
**TESTING and
DEVELOPMENT
DIVISION**

OFFICE OF ENGINEERING

WASHINGTON, D.C.

REPORT

FIELD TESTING AND DEVELOPMENT UNIT

REPORT NO. 259

PROJECT CGTD X12/1-3-7(a)

BRAIDED WAXED NYLON SHOT LINE



X12/1-3-7(a)



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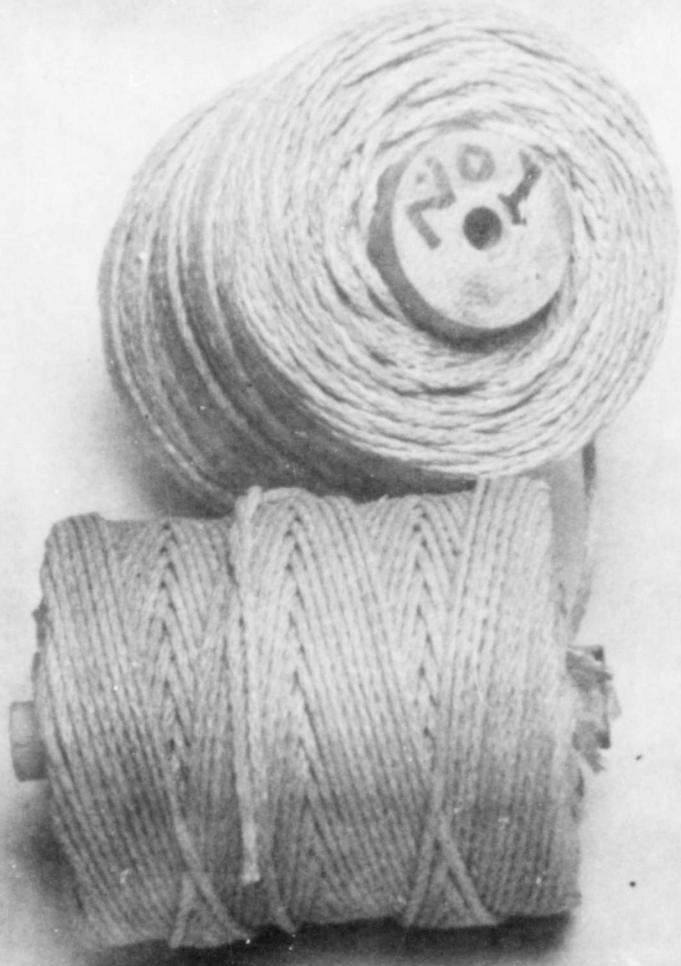
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BRAIDED WAXED
NYLON SHOT LINE
X12/1-3 (a) SIZE 3/32

FIELD TESTING AND DEVELOPMENT UNIT

PROJECT CGTD X12/1-3-7(a)

(6)

BRAIDED WAXED NYLON SHOT LINE

By



FIELD TESTING AND DEVELOPMENT UNIT
U. S. COAST GUARD YARD
Curtis Bay, Baltimore 26, Maryland

(11)

15 SEP 1961

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12b.

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Authority: This project was performed under the authority of Commandant (ETD) letter dated 6 July 1961, file ETD, CGTD X12/1-3-7(a).

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1. MATERIAL TESTED:

→ This report describes tests of nylon shot line, 3/32 inch in **diameter**, intended for use with the U. S. Coast Guard .30 caliber shoulder line-throwing gun. The Shot line was manufactured by the Sampson Cordage Company. Two 500-foot sample rolls of line were tested for conformance to the requirements of U. S. Coast Guard Purchase Description FS-1-61 dated 1 February 1961, as amended on 22 May 1961.

(cont'd)
P.2

2. TESTS CONDUCTED:

The following tests were conducted:

2.1 Range test, as specified by section 4.2.3 of Purchase Description FS-1-61, as amended. Figure 1 shows the equipment used in the range test.

2.2 Heat test, in accordance with section 4-2-5 of the Purchase Description, as amended.

2.3 Breaking test, as required by 4-2-4 of the Purchase Description. Because of limitations imposed by the tensile tester, the free length of each sample in the test machine was 14 inches instead of the 24 inches specified in the Purchase Description. The sample of line was subjected to a slowly increasing load, applied at a crosshead speed of 1/3 inch per minute. Three pieces of each sample were tested, and all parted before the minimum static load of 330 pounds was reached. Figure 2 shows a sample in the tensile tester.

3. RESULTS:

3.1 Table I summarizes the results of the range tests.

3.2 The heat test had no visible effect upon the samples.

3.3 The results of the breaking test are shown in Table II.

4. DISCUSSION:

4.1 As a matter of interest, a piece of the waxed shot line was placed in a bucket of water. It floated for 10 hours. A piece of nylon line, similar to that tested, but unwaxed, sank in water in a few seconds.

(cont'd p. 1)

5. CONCLUSIONS: As a result of firing tests, it is concluded
that: (1)

5.1 The distance achieved in the range tests did not approach the minimum average of 365 feet required by the Purchase Description. The average range (6 shots) for each sample was 258 feet. The maximum range for any of the 12 test shots was 295 feet.

5.2 The breaking strength of the samples was far below the 330 pound minimum required by the Purchase Description. The average for tests of 3 pieces from each of the two samples 249 pounds. The maximum strength for any of the six measurements was 285 pounds.

TABLE I
SUMMARY OF RESULTS OF RANGE TEST

SAMPLE #1 - BEFORE HEAT TEST

SHOT NO.	WIND DIRECTION RELATION TO <u>LINE OF FIRE</u>	WIND FORCE	DEFLECTION (FEET)	DISTANCE (FEET)
1	Calm	Calm	4 L	250
2	"	"	3 R	252
3	"	"	5 R	248

SAMPLE #1 - AFTER HEAT TEST

4	↗ R	5mph	21 R	295
5	↗ R	"	20 R	248
6	↗ R	"	22 R	257

AVERAGE OF 6 SHOTS - - - - - 258

SAMPLE #2 - BEFORE HEAT TEST

1	Calm	Calm	8 R	250
2	"	"	5 R	250
3	"	"	6 R	248

SAMPLE #2 - AFTER HEAT TEST

4	↗ R	5mph	17½ R	294
5	↗ R	"	20 R	276
6	↗ R	"	15 R	231

AVERAGE OF 6 SHOTS - - - - - 258

All shots above were fired at 30° elevation with 13 oz. projectile. The line payed out freely with no entanglement on all of the shots.

NOTE: TWO SHOTS CONDUCTED FOR INFORMATION PURPOSES ONLY AT ~~30°~~^{45°} ELEVATION.

1	↗ R	5 mph	15 R	277
2	↗ R	5 mph	15 R	300

TABLE II
RESULTS OF BREAKING TEST

SAMPLE #1

NUMBER	<u>TENSILE STRENGTH</u>	<u>ELONGATION</u>
1	Parted 2" from lower jaw at 240 lbs.	Elongated 7 $\frac{1}{2}$ " or 53.6%
2	Parted on first turn of upper jaw at 237 lbs.	Elongated 7 $\frac{1}{2}$ " or 53.6%
3	Parted on first turn of upper jaw at 240 lbs.	Elongated 7-3/4" or 55.4%
AVERAGE	- 239 POUNDS	54.2%

SAMPLE #2

1	Parted on first turn of lower jaw at 285 lbs.	Elongated 8" or 57.2%
2	Parted on first turn of upper jaw at 240 lbs.	Elongated 7-3/4" or 55.4%
3	Parted 1" from lower jaw at 250 lbs.	Elongated 8 $\frac{1}{2}$ " or 62.7%
AVERAGE	- 258 POUNDS	58.43%
AVERAGE OF 6 TESTS	- 249 POUNDS	56.3%

The tests above were conducted in a Dillon Universal Testing Machine. The samples were 14 inches in free length due to the limits imposed by the size of the machine and the elongation of the shot line. Crosshead speed was 1/3 inch per minute. All samples had been subjected to 6 firings and to the heat test.

APPENDIX B
PHOTOGRAPHS



FIGURE 1
EQUIPMENT USED IN RANGE TEST. GUN HAS BEEN FIRED.

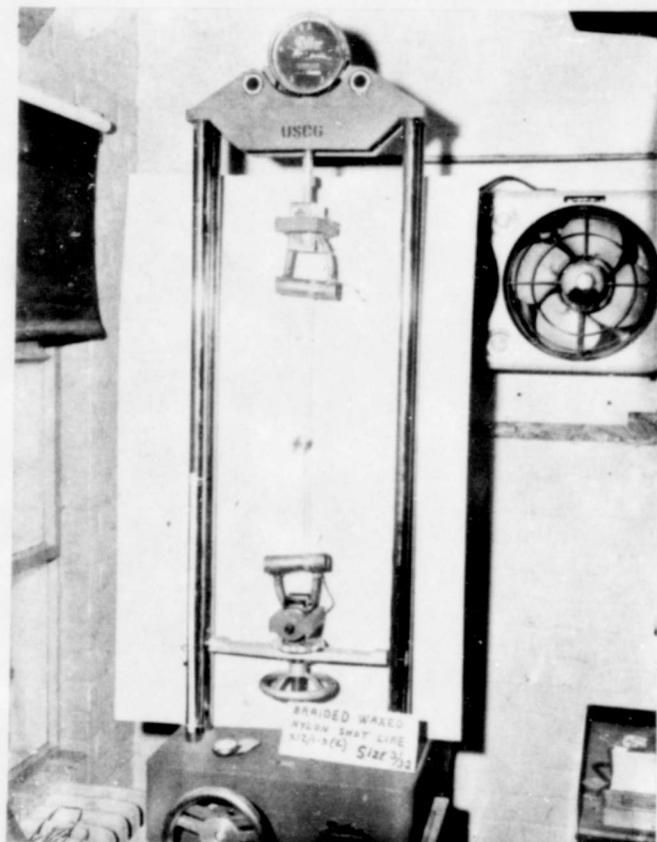


FIGURE 2
SAMPLE IN TENSILE TESTER

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